

# Establishing Environmentally Sustainable and Economically Efficient Economies: From Waste Management Towards Zero Waste

## Report for Oregon and the Pacific Northwest

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### INTRODUCTION

This document recommends establishing zero waste goals and policies in Oregon and the Northwest and suggests a number of steps that can be phased-in to achieve this. To aim towards zero waste, the region must move from an existing dominant focus on waste management to a new focus on preventing waste as it is currently defined, redesigning the waste management infrastructure, and on generating income and jobs through waste-based economic development. These steps will be good for the economy and environment.

Preventing waste must be an integral component of any effective sustainable development strategy in Oregon and the region. This is because our current paradigm of waste generation and disposal leads to the continual need to extract excessive amounts of virgin and toxic minerals, metals and fossil fuels from the earth's surface and to the continued discharge of those same materials in new, often more toxic forms, into the same environment that we rely on to provide basic ecological services (e.g. clean air and water). Our "extract, use and discard" system squanders valuable resources while creating an accumulating debt of damage to land, air, water resources and biodiversity

We believe that it is possible to move towards zero waste in Oregon and the Northwest through an interconnected three-part strategy: 1) develop "extended producer responsibility" goals and policies which require that manufacturers develop take-back strategies for all products that currently end up in landfills or incinerators. These policies are intended to force the emphasis "upstream" to stimulate new product designs and material selections which facilitate the reuse and recycling of products; 2) improve the "downstream" reuse and recycling of end-of-product-life materials through improved waste management infrastructure, waste exchange programs, recycled material market development and other steps; and 3) foster and support waste-based businesses as economic development and jobs creation opportunities, especially in low income rural communities or urban neighborhoods.

The recommendations in this document are based, in large part, from lessons learned through our three-year project working with communities, for-profit firms and non-profit organizations throughout the Northwest to stimulate waste-based economic development. Our recommendations were also informed by zero waste programs unfolding across this nation and around the globe.

The goal of our waste-based economic development project was to identify the policies, programs and tools needed to stimulate for-profit and non-profit reuse and recycling business development. It included site assessments to identify for-profit business

opportunities in the Hood River, Wasco and Sherman Counties region, the Southern Willamette Valley region and the Lower Rogue River region of Oregon. It also included jobs-through-recycling training and technical assistance to non-profit Community Development Corporations throughout the region.

Based on our past three years work, we conclude that while there are many existing waste-based economic development opportunities available, perhaps the biggest obstacle these industries face in becoming significant economic forces is that manufactures fail to design their products for easy disassembly, reuse, recycling and eventual natural decomposition. They also intermingle toxic and natural materials in the design. While design for disassembly and recycling and the use of naturally occurring materials is growing, the major focus of future efforts to reduce waste must be on encouraging product design and production which makes reuse, remanufacturing, recycling and natural decomposition of all products and materials relatively easy and part of the formal production cycle.

It is our desire that this paper be circulated widely in order to elicit comments and to stimulate debate about the idea and the specific proposals.

## **WHAT IS ZERO WASTE?**

Achieving Zero Waste means all materials which currently end up in landfills or incinerators are returned "upstream" to the materials and production cycle as feedstock for new products or services, or naturally decompose so they can be reintegrated into nature without environmental impacts. The need to move towards zero waste goals and policies is driven by economic, environmental, and social needs.

From an economic viewpoint, reducing and eliminating waste can significantly benefit a company, community or region's *financial performance and productivity*. The huge amount of waste generated by society today indicates inefficiencies in product design, materials selection and manufacturing and service delivery systems. The inefficiencies equate to lost capital and revenue at the company, community and state/regional levels. A tremendous investment of money and resources was required to extract raw materials, process them, turn them into manufactured products and then deliver them to the end user. These investments often are lost, in very short order, as the imbedded energy and product materials are used and then buried or incinerated. Extending the productive life of these materials and the embedded energy required to make them as far as possible generates a much greater return on investment. Implementing the process and operational improvements needed to eliminate waste creates greater efficiency which in turn increases productivity.

From an individual firm's point of view, an existing waste stream is a financial liability: incurring storage, processing, transportation, liability and disposal costs. If the waste stream can be significantly reduced or eliminated, the economic benefits as well as the

reduced risk to shareholder value can be significant. The best way to reduce the waste stream is to redesign products and processes so that non-toxic, naturally occurring materials and substances are used and so that products are designed for easy disassembly, reuse and recycling. This eliminates waste as we currently think of it by helping to ensure that all materials are continually recycled and reused at the end of product life.

In his recent book *Cool Companies*, Joseph Romm describes the productivity benefits of reducing waste: "A stunning example of increasing productivity by decreasing waste comes from the authors of the book *Dynamic Manufacturing*. They found that "reducing materials waste often improves productivity far beyond what one might expect from the material saving alone." Their study looked at Total Factor Productivity (TFP), which is not merely the output per unit of labor but also a calculation of the product output as a function of all labor, capital, energy, and materials consumed in its production. TFP examines the overall efficiency of a process, as opposed to the efficiency with which it uses any single factor, such as labor. The "waste rate: is the ratio of wasted material (scrap and rejects) to total cost. The table summarizes their finding in one plant:

| <i>Plant</i> | <i>Average Waste Rate (Percentage)</i> | <i>Effect on TFP of a 10 Percent Reduction in Waste Rate</i> |
|--------------|--|--|
| C-1          | 11.2                                   | +1.2   |
| C-2          | 12.4                                   | +1.8   |
| C-3          | 12.7                                   | +2.0   |
| C-4          | 9.3                                    | +3.1   |
| C-5          | 8.2                                    | +0.8   |

The authors note that "reducing waste...by 10 percent from its mean value (which by itself would reduce total manufacturing costs by only half of 1 percent) appears to have been accompanied by a 3 percent improvement in total factor productivity." This reveals the "powerful impact that reducing wasted has on overall productivity."

Zero waste policies will also stimulate the design and production of more environmentally sustainable products and services. They will use naturally occurring materials(non toxic) and consequently will be more easily disassembled, reused or recycled and naturally break down and be re-assimilated into nature when all useful value is lost. This will reduce the management and clean-up costs of waste facilities, landfills and incinerators, which are mostly borne by taxpayers. The Short Mountain Landfill in Lane County exemplifies these issues. Not only does the county manage this site just south of Eugene, it (i.e. taxpayers) must continue to pay for the clean up the leachate that is seeping into the nearby Willamette River.

Finally, whole new industries will be created by placing a major emphasis on zero waste. With the right policies in place, entrepreneurs will find many new, creative business opportunities using reused and recycled materials. New jobs will be just one outcome. Our waste-based economic development project underscores this point. We identified over 40 for-profit reuse and recycling businesses which could be created based on the waste material we identified being collected in the Columbia Gorge, Illinois Valley and Southern Willamette Valley regions of Oregon. We also helped non-profit CDCs begin development of six waste-based businesses in Oregon and Northern California. Both of these initiatives just scratched the surface. Many more opportunities exist for entrepreneurs to exploit.

From an environmental perspective, the process of continually extracting virgin materials and toxic minerals and metals to serve as feedstock for new products often damages fragile ecosystems and habitats. In addition, landfilling - even when done to the highest standards - often causes toxic leaching into ground and surface water as well as soil contamination; incineration generates harmful toxic emissions. All of these environmental impacts can be reduced by keeping existing materials in useful service as long as possible.

From a social perspective, landfilling and incineration often occur close to economically disadvantaged communities. This raises significant questions about environmental equity and justice. These concerns can be addressed by reducing the need for environmental and socially harmful landfills and incinerators. In addition, many of the jobs and business opportunities that may emerge to reuse and recycle material formerly headed for the waste stream can be established in economically distressed rural communities and urban neighborhoods. This will provide an economic development benefit to these communities.

## **WHY SO MUCH WASTE?**

Over the past two hundred years, the U.S. economy has grown and prospered due to our abundant natural resource base. The availability of cheap and readily available energy and resources created a basic paradigm for U.S. companies and consumers to overuse resources and generate substantial waste. Today, U.S. firms still require 50 percent more energy to produce a dollar of goods than Japanese companies. They produce roughly five times the waste per dollar of goods sold as Japanese companies and more than twice that of German companies.

Our national paradigm of abundant resources, energy, and waste created the belief that waste should be dealt with only after it had been created through landfilling, treatment and incineration. This is a very expensive, inefficient end-of-pipe approach to waste.

Over the past 30 years, there has been little change in the way waste is managed. Emphasis has been traditionally placed on public health issues and on improving the cost-

efficiency of collection systems. The recovery of materials for reuse and recycling has generally been a lower priority and even then, many agencies believe that all of the "low hanging" fruit has been picked.

Yet, throughout Oregon (and the Northwest) we found local landfills with limited lives, and most pose some type of environmental risk. Even with increased efforts to minimize waste, many Oregon landfills will be at capacity within the next 15-25 years. New environmentally benign landfills sites are very hard to find.

Many Northwest companies and communities still look at landfilling or incineration as a simple and accepted means to dispose of waste; most fail to complete any type of financial analyses on the costs and benefits of alternative waste prevention, reuse and recycling techniques. Environmental regulators have also traditionally emphasized end-of-pipe waste management, although this is starting to change.

## **IS ZERO WASTE POSSIBLE?**

In a natural ecosystem there is a balance whereby the wastes from one process or species become the food or resources for other species or processes. Nothing is wasted. In our society, waste is accepted as a natural part of life. We believe it is possible to change today's dominant waste paradigm. Indeed it has already begun to change in some quarters.

Even with better waste management practices, under our current "extract, use and discard" paradigm, zero waste will not be possible. However, if our society makes a concentrated effort to phase-in zero waste policies over the next few years, the requirements to reuse and recycle materials will eventually generate products made from naturally occurring materials which are designed to be reused and recycled and then eventually break down and be naturally assimilated back into nature. Thus, our waste will become food for some other organism or process and we can achieve zero waste, or darn close to it.

This is not as far fetched an idea as it may first appear. Many major corporations are committing themselves to become waste-free. For example, Interface Inc., a leading global manufacturer of carpet and floor coverings, has decided to be a "zero waste company." This includes eliminating scrap, one of the traditional types of waste, and misdirected shipments, incorrect invoices, and defective products. From 1994 through 1998 Interface cut its waste by 54 percent by weight and in doing so cut costs by \$76 million. They used an integrated design approach with the goal of simultaneously minimizing costs and environmental impact. The company is "redesigning its processes and products into cyclical material flows where 'waste equals food.'" (J. Romm, 1999).

Xerox Corp. is another firm that has committed itself to produce "Waste-Free Products from Waste-Free Factories." In 1993 they initiated their Waste-Free Factory Program

with the goals of decreasing municipal, hazardous, and chemical waste by 90 percent and decreasing water discharges by 90% among other goals. Each Xerox factory performs annual self-assessments against nine specific target areas to provide an overall Waste-Free Factory Score. Plants are designated "Waste-Free" when they have achieved an overall score of 450 out of a possible 500. Xerox seeks to meet its zero waste goals through source reduction, the use of post-consumer materials in at least 60 percent of material purchases, reuse, recycling, remanufacturing and energy efficiency initiatives (J. Romm, 1999).

If major companies like Interface and Xerox can become waste-free, so can others. If Oregon and the Northwest make a commitment to redesign products, processes and services, zero waste can become a reality by 2025. Preventing waste can save us from leaving future generations the legacy of squandered resources, accumulated waste and pollution. It can also help to establish Oregon and the Pacific Northwest as the center of excellence in sustainable resource management and business development.

## **COMPONENTS OF A ZERO WASTE STRATEGY**

The key to achieving zero waste in Oregon and the Northwest is to move from our current dominant focus on waste disposal to an integrated focus on preventing waste and generating new jobs and economic benefits from industries that reuse, remanufacture and recycle products and materials which formerly ended up in landfills and incinerators.

We propose an interconnected three-part strategy to help accomplish this: 1) develop "extended producer responsibility" policies which require that manufacturers develop take-back strategies for all products that currently end up in landfills or incinerators; 2) vastly increase the reuse and recycling of end-of-product-life materials through improved waste management infrastructure, waste exchanges, recycled material market development programs and other steps; and 3) foster and support waste-based businesses as an economic development and jobs creation opportunity, especially in low income rural communities or urban neighborhoods.

### **1. Extended Producer Responsibility Goals and Policies**

*Extended producer responsibility (EPR) or product take-back policies* are central to achieving zero waste. These policies shift the responsibility for waste from the public entities that traditionally manage waste to the manufacturers who produce it. Reversing the burden of responsibility is necessary because manufacturers are best positioned to alter the way products are designed, manufactured, delivered, used, reused and recycled throughout their life-cycle. There is a growing belief that government and tax payers should not bear the burden of handling the waste, along with its associated long term environmental liabilities, generated by the private sector. A growing number of experts have pointed out that consumers should not have to pay once to acquire an object, again to the rid of it, and yet again to cleanup the damage created by its production and



disposal. The way to alter this inefficient cycle is to require manufacturers to prevent waste in the first place.

EPR means those who produce products become responsible for them from the moment the product is created through the post-consumer stage. A company must be as concerned with proper design and manufacturing of a product as with what will become of the product at the end of its useful life. EPR programs typically require recycling and reuse and often contain mandated recycling targets. EPR provides the missing link between product design and recycling—a link that is the key to making zero waste efficient and economic.

There is no federal legislation in the U.S. on EPR. Policies were proposed for packaging as part of the Resource Conservation and Recovery Act (CERCLA) reauthorized in 1992, but they did not pass. However, there are policies and programs in other nations and states.

For example:

- In Germany, the responsibility for packaging waste lies fully on the industry, whereas in France and Japan the responsibility is shared by government and private industry.
- In the U.S., the President's Council on Sustainable Development defined the concept of "extended product responsibility" as considering the entire life of the product, from design to disposal, to identify strategic opportunities for resource conservation and pollution prevention.
- The California Resource Recovery Association adopted a zero waste agenda in 1997, though it is unclear how it will be implemented.
- An example of EPR in the U.S. is the nickel-cadmium battery take-back program that has been passed by eight states. Based on producer responsibility requirements of these states, the industry instituted a national product take-back program. The manufacturers of Ni-Cds and the products that contain them have voluntarily set a recycling goal of 70% by 2001, up from 2% in 1993 and 15% in 1995.
- Kodak takes back and recycles its single-use cameras.
- A vehicle recycling partnership developed by Ford, GM, and Chrysler invests in research and development to create improved product design and both infrastructure and technologies for recycling. As a result mercury switches, which have been a barrier to recycling, are being eliminated in cars produced by these partners.
- Interface Corp., the nation's largest supplier of commercial carpet and floor coverings, offers carpet leasing as an option to buying, which provides incentives to make a more durable product and reduce waste. Interface now makes its carpets from recyclable, naturally occurring materials and bears the responsibility for the carpets they manufacture from the production phase through end-of-product-life.
- There has been a tremendous growth of interest in recent years in reusing industrial waste streams of all kinds. Companies like 3M, Monsanto, and Coors

- have increased their profits substantially by reducing their waste streams and turning them into new sources of revenue.
- A number of U.S. chemical suppliers have developed extended producer responsibility strategies by selling services rather than products. They are offering to keep plants clean rather than selling the actual chemicals to clean them. This results in a reduction in the amount of chemicals being used and discarded.
- Local examples include the Oregon bottle bill which requires those stores that sell certain types of bottled beverages to accept the containers back for recycling.

One key component of a Zero Waste strategy should be to institute product take-back policies for all waste categories, including cardboard and paper, construction material, plastic, rubber, metal, toxic substances etc. Different waste materials would have different types of product take-back strategies:

- *Compostable or consumable materials* - these products and packages are a haven for living organisms, and hence can cause disease. Local government would retain the responsibility for administering the collection and processing of food waste and other compostables as necessary to protect public health.
- *Durables* - many products including cars, televisions, tires, recyclable materials and computers would remain the property and responsibility of the manufacturer. Manufacturers would be entirely responsible for the costs for separation, collection, and recycling, this would ultimately encourage repairable products made from fewer, more easily separated and recycled materials.
- *No Sales* - this is the portion of the materials stream, including toxins, refined heavy metals, and items which cannot be rendered stable and non-toxic or safely used as food for living organisms. These products would be tagged to identify the manufacturer and remain their property and responsibility. The goal is to eventually phase-in naturally occurring materials.

We recommend that product take-back targets be established with the long-term goal being zero waste by 2025.

## **2. Significantly Improve Reuse and Recycling Programs and Techniques**

Better product design and materials selection through EPR programs will lead to easier and more comprehensive ability to reuse and remanufacture products and recycle materials. To capitalize on these opportunities existing waste management systems will need to be redesigned to fully capture end-of-life materials to facilitate their reuse and recycling .

In Oregon, many of the programs of the Department of Environmental Quality provide a sound basis for managing waste and encouraging recycling. DEQ has worked with each watershed (mainly counties) to set target recovery rates for recovering waste materials within that watershed. These rates range from 8% in Lake County to 52% for the Portland Metropolitan area, with the average target for the state being 27.3%. These

targets are admirable and have a positive impact on the environmental quality within the state. Targets are not enough, however. Reuse and recycling must be greatly increased by redesigning transfer sites and landfills to maximize the recovery of resources, establishing effective waste exchanges, opening new markets for materials, increasing collection rates and efficiencies, eliminating subsidies for virgin materials and increasing public education.

### **A. Redesign the Waste Management Infrastructure**

Our site assessments in the Columbia Gorge, Illinois Valley/Lower Rogue and Southern Willamette Valley found that existing landfills, each with their own tipping fees, associated roads and infrastructure is extremely inefficient and costly and leads to perverse incentives. One of the most obvious examples is Lane County's need to establish a levy against city licensed waste haulers who dump trash in landfills outside the county. The county claims it is losing the \$46 per ton dumping fee which puts its waste management and other programs at risk. In sum, Lane County says it now *must* accumulate more waste at the Short Mountain landfill (which already leaches contaminants into the Willamette River) to maintain the waste management system (we need waste to manage our waste). While Lane County's situation may be extreme, similar inefficiencies and perverse incentives exist throughout the region.

We conclude that if all waste materials handled at transfer sites and landfills were initially handled at sites designed to fully recover materials, the high economic and environmental costs of landfill management could be reduced and a significant amount of additional materials would be recovered. Therefore, we recommend:

- Dedicated Resource Recovery Facilities should be established in every county. These facilities should be designed for easy serial drop-off, materials separation, reprocessing, resale and distribution of materials "upstream" into the materials cycle.
- The Resource Recovery Facilities should be designed to allow existing recycling businesses and new incubating industries to locate close by. This will allow the outputs of one process to be used as inputs for other manufacturing or value-adding processes.
- Existing landfills should be managed so that buried materials can be mined and reclaimed. Materials which today cannot be reused should be safely stored for future recovery when new technologies become available. Tremendous amounts of valuable materials sit buried in the region's landfills. These should be viewed as deposits for future use, not as sites to be covered and forgotten (nature will certainly never forget them as most will continue to generate environmental hazards for decades or centuries to come.)
- Policies and financial incentives should be established to foster and support increased agricultural use of compost derived from urban markets and for bio-products in general.

- Environmental labeling and certification programs should be expanded to promote increased recycled contents in products.

## **B. Enhance The Use Of Waste Exchanges**

Another important component in increasing reuse and recycling is waste exchanges. A waste exchange involves one company giving or selling its waste to another company which in turn uses the material for another purpose. Waste exchanges are becoming an increasingly popular means of getting rid of waste products for an individual firm.

However, while a waste exchange is a viable option for many businesses, there are currently a number of barriers to efficient operation. These include: the lack of an effective marketplace for waste materials, poor quality or impurities with the waste products, an irregular supply of waste materials, regulatory hurdles, and lack of information. Each of these barriers can be overcome with careful planning and new policy development. A central role for agencies and governments seeking to advance economically and environmentally sound waste reduction and economic development in the region should be to assist industries in overcoming the barriers to waste exchange.

There are a variety of waste exchanges including:

- *Direct match*: one company's existing waste stream can be used as feedstock by a second company.
- *Waste upgrade*: through process redesign, one company's waste stream can be sufficiently upgraded to become an attractive feedstock for a second company
- *Feedstock substitution*: a company currently using virgin materials can use a local company's lower-grade waste stream as feedstock.

When a match is made, special-purpose contracts can be written which specify the characteristics, timing, and quality of materials to be delivered. These contracts are increasingly routine

Some of the most significant costs in turning a waste stream into a financial asset include the assessment that is needed to determine where waste occurs in a firm and also the identification of markets for that waste. Conducting a formal waste assessment can initially be costly and time-consuming. However, it is often not necessary to do a full-blown analysis to get the information needed to identify waste and establish solutions. The up-front investment may pay off with greatly reduced costs and economic risk down the road.

## **C. Stimulate Market Demand.**

To stimulate market demand for products made from recycled materials, the region should consider implementing:

- Mandated minimum requirements for products, including writing and printing paper, deconstruction, road construction, beverage containers, and other packaging materials.
- Government procurement requirements that favor products made from recycled material, including direct purchasing and indirect purchasing (contractors).
- Local market expansion focused on assistance to existing users of recycled materials and new companies recruited to the region, including right of first refusal to purchase recovered materials from government-sponsored programs (including business assistance loans and research and development grants.)
- Tax incentives for "green building" projects that use recycled construction materials.
- Incentives for companies initially to require their suppliers to provide materials with minimum levels of recycled content, and then within 25 years to require them to provide materials made of 100% recycled materials.

#### **D. Increased Collection Rates and Efficiencies.**

To increase efficient reuse and recycling, the following should be considered:

- "Pay-as-you-throw" pricing systems for government and private sector providers are needed (households pay only for volume of waste discarded, recyclables are collected for no fees).
- Ban on recyclables from disposal facilities (with a phase-in schedule).
- Low-interest loan program for local governments and haulers to improve productivity in recycling activities.
- Deconstruction policies which require the recovery and reuse of building materials in new construction.

#### **E. Eliminate Subsidies for Use of Virgin Materials Except Where Absolutely Necessary.**

One of the primary reasons that some industries' continue to use virgin materials is that they are often cheaper than recycled materials. Cutting old growth trees and mining more minerals and metals is often cheaper than using recycled materials because the industries which extract the materials are directly or indirectly subsidized. Many of the subsidies were established decades ago to promote western development and growth, issues often no longer relevant today. Yet, the industries that benefit from the subsidies fight hard for their continuation, to the detriment to taxpayers and the environment.

We recommend that targeted effort be made on examining subsidies which encourage the use of virgin materials, minerals and metals and fossil fuels. Those that create a competitive disadvantage for reused and recycled materials should be evaluated for elimination. (Grass Roots Recycling Network, 1999).

#### **F. Education and Public Awareness.**

Information programs to increase awareness of the economic and environmental benefits of reuse and recycling must be an integral part of any zero waste program. We recommend the following components of a public education program:

- In-school and public education programs focused on recycling and waste reduction in home, work place and in public.
- Labeling requirements for all products and packaging to indicate (1) amount of recycled content, (2) reuse and recycling instructions and/or (3) industry take-back programs.
- Zero waste data gathering, analysis and reporting by state environmental agencies (e.g., recycling- and reuse-related jobs, environmental savings, ecological indicators).
- Community waste audits and benchmarks that allow citizens to know the types and quantities of waste generated locally and to establish community programs to reduce them.
- Public recognition of innovative achievers in product redesign, alternative materials and waste reduction.

### **3. Foster and Support Waste-Based Enterprises as an Economic Development and Jobs Opportunity**

As products become designed and manufactured to facilitate reuse and recycling, and as waste management systems are redesigned to fully capture end-of-life materials, a tremendous number of new business and job opportunities can emerge in the reuse and recycling of the materials - what we call waste-based economic development.

Our work with for-profit firms and non-profit organizations throughout the Northwest fully supports the business and job potential of waste based economic development. Reusing and remanufacturing products rather than having consumers throw them away is not a new concept - indeed it dates back hundreds of years. Remanufacturing is estimated to use one-fifth the energy use and one-tenth the raw materials needed to make a product from scratch. Yet, reuse and remanufacturing have another positive attribute - they are labor intensive. Manufacturing new products from scratch is generally capital, resource and energy intensive. Reuse and remanufacturing, on the other hand, requires workers to disassemble products and repair, replace, upgrade parts, reassemble and then re-inspect them. Human labor and intelligence plays a much larger role than the use of capital intensive resources.

Our experience indicates that waste-based economic development can become a major economic force in the region. For-profit firms may capture much of this growing market as they have the capacity to raise the capital required to operationalize creative new entrepreneurial ideas. However, there will be key niches available for non-profit organizations also— especially those serving economically distressed rural communities and urban neighborhoods.

As with any new industry, imagination and effort will be needed to develop the new technologies and identify the niche markets needed to help the industry grow.

To foster and support the economic development and job potential of reuse and recycling business we recommend:

- It is essential that research and development continue to identify new technologies and innovative ways to turn used materials into useful new products. Research dollars and support must be provided by government, industry and communities to both the "upstream" process and product redesign component and the "downstream" material handling, separation and recycled product development components. Reducing the costs of testing of products for reuse and recyclability is essential.
- The development of a coordinated state and local approach to foster and support resource recovery and waste-based economic development. These efforts should identify and resolve technological, management, funding and policy obstacles.
- State and local coordinating efforts should also seek to establish and foster links between research and for-profit and non-profit organizations to develop new and improve waste-based economic development, technologies and practices.

## **THE JOB POTENTIAL FROM A ZERO WASTE PHILOSOPHY IN THE PACIFIC NORTHWEST**

Research has shown that reuse and repair are not only a top priority in waste reduction, but also the best opportunity for creating jobs per ton of material recovered. Simply sorting and processing recyclables sustains 5 to 10 times more jobs than incineration or landfilling. Each step a community takes to add value to materials recovered from the waste stream means more local jobs and more local self-reliance.

Recycling and reuse jobs vary from entry-level to skilled, from managerial to entrepreneurial. Occupations have a broad spectrum of training requirements-- with good wages. In Florida and North Carolina, for example, average wages in the recycling industry are \$10.56 and \$9.00 per hour, respectively. A Community Development Corporation involved with waste-based economic development in Eugene, Oregon pays almost \$10.00 per hour and provides excellent benefits to all employees.

The Pacific Northwest states are recycling at levels around 35%. We believe it is possible to increase the diversion rate to 60% by 2005, to 75% by 2010 and to **100%** by 2025. There is a job growth potential in achieving each of these recycling goals as follows:

|                 | <b>Washington</b> | <b>Oregon</b>    | <b>Idaho***</b> |
|-----------------|-------------------|------------------|-----------------|
| Waste generated | 6.6 mil. tons     | 3.4 mil.<br>tons | .9 mil.<br>Tons |

|  |               |               |            |
|--|---------------|---------------|------------|
| Diversion rate   | 38%           | 33%           | N/A        |
| Increase in diversion rate to get to 60%                         | 22%           | 27%           | N/A        |
| Tons of waste diverted to get to 60%                             | 1.5 mil. tons | 0.9 mil. tons | N/A        |
| Existing recycling-related jobs                                  | 16,700        | N/A           | N/A        |
| <b>Potential jobs created by reaching a 60% diversion rate**</b> | <b>4,511</b>  | <b>2,706</b>  | <b>108</b> |
| Increase in diversion rate to get to 75%                         | 37%           | 42%           | N/A        |
| <b>Potential jobs created by reaching a 75% diversion rate</b>   | <b>7220</b>   | <b>4211</b>   | <b>N/A</b> |

\*\* Calculations are made as follows (using Oregon as an example): For every 100,000 tons of waste diverted from the waste stream:

- (i) 65.2 recycling processing jobs are created,
- (ii) 224.6 recycling manufacturing jobs are created,
- (iii) 509.8 reuse jobs are created.

Of the new 0.9 million tons diverted from Oregon waste stream (by increasing the diversion rate to 60%), 95% would create new jobs in processing and manufacturing, and 5% would create new jobs in reuse. Therefore:

0.9 million tons \* .95 = 0.855 million ton (or 855,000)  
0.9 million tons \* .05 = 0.045 million tons (or 45,000 tons)  
855,000 tons/100,000 = 8.55  
45,000 tons/100,000 = 0.45

|                                |            |
|--------------------------------|------------|
| 8.55 * 65.2 jobs = 557 jobs    | 557        |
| 8.55 * 224.6 jobs = 1,920 jobs | 1,920      |
| 0.45 * 509.8 jobs = 229 jobs   | <u>229</u> |
| Total                          | 2,706      |
|                                | Jobs       |

\*\*\* Idaho figures derived from extrapolation from population figures. The diversion rate in Idaho is calculated at 40 percent.

Please Note that these jobs would occur primarily in the "downstream" reuse and recycling side of the economic value-chain. Even more jobs may be generated in the "upstream" (extraction) and "midstream" (product and service design, manufacturing and delivery) sides of the economic value-chain as efforts to achieve zero waste move forward.



## **PHASE-IN Strategy for Achieving Zero Waste in Oregon and the Northwest**

A zero waste strategy can provide the framework needed for sustainable production and consumption in Oregon and the Northwest. We propose that the State of Oregon and the Pacific Northwest set the targets on becoming a waste-free society by 2025. The success of the strategy to achieve this will depend on the involvement and commitment by business, government and communities.

Residents of Oregon and the Northwest have already demonstrated their willingness to recycle. Of the solid waste generated in Oregon, almost 30% of it is recycled and in Washington, 33% is recycled. Data for Idaho was not available. It is necessary that the public, industry and government work together to find innovative regulatory and non-regulatory measures to ensure that the goal of zero waste is met.

Increased public awareness and recognition for innovative changes will be a key to help foster change in the general public. Identifying achievers in producer-responsibility as well as waste reduction can go hand-in-hand with targeted information and promotional campaigns, and new policies. Communities and states should produce annual progress reports that compare progress in product redesign and waste reduction against established benchmarks.

In addition to increased public awareness, government policies must be changed. For example, government policies should require the use of "environmentally preferable" goods and services. The federal government currently has a policy that requires federal agencies to seek out products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services. This comparison may consider raw material acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service. The Executive Order issued by President Clinton applies to the purchase of, printing and writing paper, procurement of re-refined lubricating oil and retread tires, recycling, reuse, or refurbishing of mixed cardboard/paper, aluminum, plastic, glass, pallets, batteries, scrap metal, and fluorescent lamps and ballasts. This applies not only to federal employees and agencies but to contractors and federally-leased space as well. An Executive order has also been issued on the purchase of bio-based products.

The States of Oregon and Washington have also instituted policies promoting the purchase of recycled materials and products. For both, state-wide purchasing practices are required to assure materials are recycled or which may be recycled or reused when discarded, to the maximum extent economically feasible. This includes work done by contractors. Specifically noted are paper products, plastics, resins, food service and packaging. This applies to all state government agencies.

The Oregon Department of Environmental Quality has implemented a number of policies that have significantly increased recovery and recycling rates in Oregon. DEQ has also educated households and businesses as to the benefits of recycling and reducing waste. DEQ pollution prevention programs have helped communities achieve target rates set in

1995 and to set higher standards in 1997. These are excellent places to start and a jumping off point for a target of zero waste by 2025.

There are a number of actions that can be taken to achieve a zero waste strategy including:

- Set state targets for eliminating waste through a stepped approach, e.g., reduce waste to 60% by 2005, to 75% by 2010 and to 0% by 2025;
- Establish product take-back policies for every product that generates significant waste (including automobiles, appliances, computers, etc.). Set targets for products that have take-back policies and programs through a phase-in approach (e.g., 10% by 2005, 20% by 2010, 50% by 2015, 75% by 2020, and 100% by 2025).
- Conduct a community waste inventory: a waste inventory needs to be developed so that a community can identify all waste being generated reused, and recycled. The inventory will include quantities, qualities, and full costs of each type of waste. Benchmarks can be set and performances monitored.
- Establish public information campaigns to allow consumers to make smart choices when making purchases;
- Establish waste reduction agreements with key industries; and
- Introduce mandatory waste audit processes

## **POTENTIAL Sources of Revenue**

There are a number of existing and potential sources of revenue to fund the movement to zero waste. These include:

### **Traditional Sources**

Traditional sources of revenue can be used for developing policies and institutions that reinforce existing programs and assist in expanding the closed-loop economic development of the Pacific Northwest. These include:

- Landfill surcharges for private and public landfills,
- Transfer station surcharges for waste being shipped out of state,
- Toxins taxes,
- Litter taxes,
- Solid waste surcharges,
- Refuse collection taxes,
- State and local government obligation bonds,
- State and local government industrial development bonds,
- Pooled industrial bonds,
- Fines and penalties owed US EPA for environmental violations,
- State and local general funds,
- Public works trust funds, and
- Unredeemed deposits on beverage containers.

## **Tax Credits**

The State of Oregon has a number of programs that facilitate the movement to zero waste. These, and many others, could be replicated across the Northwest on a state or regional scale.

### *Pollution Control Facility Tax Credit*

Offered through the Oregon Department of Environmental Quality (DEQ), this program allows state income tax credit to qualified pollution control facilities. A recycling facility is one such pollution control facility that may qualify for a state income tax credit of up to 50% of the certified value qualified facility. In most cases, the credit is taken over a 10 year period, 5% per year.

### *Reclaimed Plastic Tax Credit*

Also offered through the DEQ, this program provides a tax credit of up to 50% of the investment cost in qualified equipment which is used to either 1) collect, transport, or process recyclable plastic or 2) manufacture a product from reclaimed plastic. The credit is taken over a 5 year period at a rate of 10% per year.

### *Business Energy Tax Credit*

Offered through the Oregon Department of Energy, this program provides a tax credit of up to 35% of the capital investment in qualified recycling equipment. The credit is taken over a 5 year period at a rate of 10% for the first two years and 5% for the next 3 years.

### *Entrepreneurial Development Loan Fund*

This direct loan program, offered through the Oregon Economic Development Department (OEDD), provides small loans of up to \$15,000, with possible follow-on loans of up to \$10,000 to start-up or early stage businesses.

### *Oregon Business Development Fund*

This direct loan program, offered by OEDD, provides loans of up to 40% of a firm's total financing needs, up to a maximum of \$250,000, to supplement financing available from commercial banks.

### *Capital Access Program*

This loan guarantee program, offered by OEDD, increases availability of commercial bank loans through establishing a loan loss reserve fund for participating banks. This fund is generated from fees paid by the borrower and banks and matching funds through OEDD.

### *Credit Enhancement Fund*

This program, offered by OEDD, provides loan guarantees to banks to provide small business access to capital. It targets manufacturing, processing, natural resource, distribution, new technology, and other industries including recycling companies.

### *Industrial Development Revenue Bonds*

This program, offered by OEDD, can provide tax exempt status for bonds issued to finance capital expenditures for manufacturing operations and solid waste disposal, and recycling projects. The tax-exempt status lowers the cost of the capital. The bonds issued are obligations of the company and not guaranteed by the state.

### *Recycled Materials Markets Peer Match Program*

This program, offered by OEDD, can provide travel funds to help get expert technical assistance in recycled materials market development to Oregon companies and communities.

## **Potential Revenue Sources**

The following innovations may assist in the rapid implementation of policy components:

*Productivity Bank.* A source of capital (from bond issuance) for low-interest loans to government agencies exclusively. Agencies can use the loan to invest in programs or technologies that either reduce costs or increase revenue within agency recycling/reuse programs. The bank is repaid, with interest, from budget savings and/or increased revenues. The funds remain available for future investments by government agencies to improve recycling and waste reduction programs. The Productivity Bank can be administered by [state agency].

*Efficiency Utility.* A source of capital (bond issuance, energy surcharge, Community Reinvestment Act funds from private banks) for low-interest loans to households and small businesses for improvements in their recycling, reuse or composting systems, either on site and/or on neighborhood scale, including redesign and waste reduction projects. The efficiency utility can be administered by private financial institutions with advice and consent from state and local officials.

*Subtitle D Landfill Bank.* A source of capital to purchase existing Subtitle D landfill capacity which is inhibiting local jurisdictions from investing in recycling. Local jurisdictions are inhibited because the revenue from the flow of garbage is needed to retire debt incurred to build the landfill or cells within the landfill, or to generate revenue to pay staff. Purchased capacity will be allocated, at market rates, to communities that need landfill capacity in future years. A state landfill surcharge could finance this program.

*Resource Authority.* A source of capital for low-interest loans for expansion of existing reuse/recycling bio-product-based businesses, substitution of recycled materials for virgin materials (including products made from agricultural wastes), recruitment of new enterprises. The authority would focus on target materials such as tires, plastics, C&D, and industrial drosses and sludges which pose a particular problem for a jurisdiction or several jurisdictions.

The resource authority would also assist existing government and private sector R&D agencies with favorable loans and grants for targeted technologies and enterprises. The resource authority would work in conjunction with existing tax credits for recycling related investments. It could be administered by a statewide board of local officials, private sector firms and community-based recyclers appointed by the governor and state legislature.

*Federal Recycling Investment Tax Credit.* This would provide incentives for individuals who invest in qualified recycling enterprises. It would be modeled after the Federal Housing Investment Tax Credit Program

## **Conclusion**

We believe it is conceivable that by 2025 state and local policies and programs would require, foster and support the manufacturing of products that are designed to never become waste as we currently define it. In a Zero Waste society the focus would be on preventing waste and continually reusing materials, not waste disposal. Achieving this would help place Oregon and the Northwest on the road to sustainable resource management and economic development.

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